Correction of Secondary Deformities of the Cleft Lip Nose

Samuel Stal, M.D., and Larry Hollier, M.D.

Learning Objectives: After studying this article, the practitioner should be able to:
1. Describe the common secondary deformities of the cleft lip nose.
2. Determine the appropriate timing for surgical intervention to correct the deformities.
3. Determine the best method of addressing each of the individual secondary deformities of the cleft lip nose.

For both unilateral and bilateral cleft lip nasal deformity, the general trend has been toward operation on the cleft lip nose at the time of initial lip surgery. Secondary surgery to further modify the nasal shape is often necessary, and many patients desire complete septorhinoplasty in their teen years. Many different procedures have been suggested to address the problem, but few techniques have worked well and consistently. The authors define the underlying anatomic distortion involved in the cleft lip nose and describe effective techniques for correcting the deformity. (Plast. Reconstr. Surg. 109: 1386, 2002.)

There has been a general trend toward operation on the cleft lip nose at the time of initial lip surgery in both the unilateral and bilateral cleft lip nasal deformity. However, secondary surgery to further modify the nasal shape is frequently necessary, and a large number of patients desire complete septorhinoplasty in the teen years. Although a myriad of different procedures has been suggested to address the problem, few techniques work well and consistently. We will define the underlying anatomic distortion involved in the cleft lip nose and describe techniques that have been effective in correcting the deformity.

Anatomy

The skeletal support of the nose is best described by using the tripod concept, in which nasal support is provided centrally by the septum and laterally by the nasal sidewalls and lower lateral cartilages. Compromise of any of these structures will result in deviation of the tripod accordingly. This is pertinent with respect to the cleft lip nasal deformity. In the unilateral deformity, the problem begins with displacement of the base on which the tripod rests. The cleft maxilla is laterally displaced and hypoplastic, resulting in an altered platform for the cleft side ala. Consequently, this ala splays laterally, with associated loss of nasal tip definition, obliquity of the alar facial angle, and septal deviation. Much the same is true for the bilateral deformity, in which the ala has a
classic bucket-handle appearance with alar lidding and acute alar angulation. The problem is further compounded by the premaxilla, which is most often anteriorly positioned, causing distortion of the columella. The malpositioned osteocartilaginous framework also contributes to distortion of the surrounding soft tissue, asymmetry, and such problems as alar lidding, presence of a plica vestibularis, and loss of tip projection.

**Timing of Repair**

A limited rhinoplasty is usually performed at the time of primary lip repair. Generally, this involves only dissection and medial mobilization of the cleft lower lateral cartilage. The most common age for revision of the cleft lip nose is between 4 and 5 years. At this age, the child’s social interactions are increasing and the stigmata associated with the deformity may cause problems for the child. Assuming it is amenable to correction, any residual distortion of the nose that causes the parents or child significant concern should be addressed at this point. Procedures to modify the nose should be coordinated with lip revision; these procedures are also frequently necessary during this same time period.

The real controversy arises when complete septorhinoplasty with modification of the osteocartilaginous vault is considered. The concern is that complete rhinoplasty with osteotomy and septal manipulation will impair facial growth. Consequently, complete rhinoplasty has been generally deferred until the late teen years. However, there are data demonstrating that nasal growth is complete at approximately 11 to 12 years of age in girls and 13 to 14 years of age in boys. As such, full rhinoplasty may be performed at this time without fear of affecting growth. In reality, the reason this is not done more often in younger teenagers relates to the issue of emotional maturity. Even though nasal growth is complete at approximately 11 to 12 years of age in girls, it is unusual for an 11-year-old to be mature enough to participate in the complex decisions involved in a preoperative consultation for rhinoplasty. Nevertheless, in the mature, emotionally stable patient in the early teen years, there is no contraindication to a full rhinoplasty.

**Techniques**

**Early Revisional Surgery**

We must distinguish between those procedures we perform on the growing child’s secondary cleft nasal deformity and those reserved
for definitive septorhinoplasty in the cleft patient at the end of facial growth. During the early period, attention is focused on reshaping the cleft side ala by repositioning or derotating it. Efforts to achieve this are impaired by several factors, including deficiencies in underlying skeletal support and vestibular lining and scarring from previous procedures. Most techniques have focused on the dissection of the lower lateral cartilage through an infracartilaginous incision or through the apex of the existing incisions. The entire lower lateral cartilage is freed from the overlying skin and repositioned using sutures to a stable cephalic position to achieve projection of the dome on the cleft side.\textsuperscript{12–15} Frequently, an external bolster is used, over which the suture is secured.

Although we also advocate a similar procedure in the growing child, we prefer to more aggressively shape and stabilize the cleft lower lateral cartilage in its entirety with internal sutures. To do this, following dissection of the cartilage, the desired position of the apex of the dome of the lower lateral cartilage is chosen and a polydioxanone suture is passed through the mucosa and cartilage, pulling the cartilage to a more medial and cephalic position. This suture is taken out through the skin and then put back through the same skin exit hole, following a different dermal pathway,
and again through the lower lateral cartilage. The suture is then tied in the vestibule to the point that the cartilage is advanced to the appropriate position (Fig. 2). This functionally derotates the cartilage and suspends it to the overlying dermis. As many sutures as are necessary are placed along the length of the lower lateral cartilage to position the ala and diminish dead space of the larger cleft alar rim. This technique helps compress the plica vestibularis and improves symmetry. The alar lidding can be partially obviated by large bites of the lidded skin and vestibular mucosa during closure of the infracartilaginous incision using a 4-0 plain gut suture (Fig. 3).

These transdermal sutures cause some dimpling, which may be minimized by placing a small incision with a no. 11 blade through the location where the suture is taken. This dimpling, however, always resolves over the course of several weeks. It also negates the need for an external bolster, which is problematic from two standpoints. First, we have seen scars caused from excessive pressure placed on these bolsters. Furthermore, when the bolster itself is removed (usually at 7 to 14 days), so is the support for the repositioned lower lateral cartilage. With the above technique, the lower lateral cartilage is supported as long as the polydioxanone suture maintains its strength, usually for 2 to 3 months.

For the bilateral cleft lip nasal deformity, the techniques used for rhinoplasty have been categorized by Cutting and colleagues into two groups: the skin paradigm and the cartilage paradigm. The focus of the skin paradigm has been on augmentation of the deficient columella by means of flaps advanced in from the lateral aspect of the philtrum or the nasal floor. However, these techniques do nothing to address the underlying abnormality in the lower lateral cartilage, and they frequently produce abnormally long and unusual appearing columellae (Fig. 4). Mulliken’s observations on the columella after the staged forked flap procedure show a classic pattern so often seen in our own patients: (1) a rectangular columella (without a waist and with a broad base), (2) a sharp columellar-labial angle, (3) abnormally elongated/enlarged nostrils, and (4) a tendency to an overly long columella with a disproportionate ratio of nostril length to nasal tip. It is our opinion that additional tissue, especially from the lip, is not necessary to lengthen the columella in the vast majority of cases and should only be used conservatively and for minimal skin advancement.

With respect to those procedures focusing

![Image](image_url)

**Fig. 3.** Transdermal suture suspension technique in primary cleft lip rhinoplasty. **(Left)** Preoperative appearance. **(Right)** Immediate postoperative appearance.
on the deformed lower lateral cartilages, the individual techniques vary primarily in the incision used to access the domes and may be as direct as McComb’s gullwing incision along the tip or Cutting and Grayson’s prolabial unwinding flap. The basic philosophy is the same as with the unilateral cleft nasal deformity. The lower lateral cartilages are dissected out from the overlying skin envelope, and the lateral crura are advanced medially and secured to one another to create a more normal appearing tip. Further shaping of the tip can be achieved with the technique described above using transdermal sutures.

Definitive Septorhinoplasty

Once growth is complete and the patient is emotionally mature, patients may be considered candidates for full osseocartilaginous vault modification, should they so desire. We usually prefer the open approach for these patients.

Before tip reshaping is begun, the support of the alar base must first be assessed. For patients with a severe skeletal deficiency, augmentation should be considered. This can be accomplished by placing either a bone graft or block hydroxyapatite through an intraoral incision, which is then secured in a subperiosteal location near the piriform aperture below the cleft side ala. In patients with the most severe skeletal deficiencies, the cause is often a retrusive maxilla, and a Le Fort I advancement osteotomy should be performed before any attempt is made at definitive rhinoplasty (Fig. 5).

As in the procedures performed at a younger age, attention is given to reshaping the lower lateral cartilages with suture techniques. However, this is usually insufficient to adequately correct the deformity. In the unilateral cleft lip nose, we frequently augment tip projection using graft material. It is our preference in most cases to use a strut of septal cartilage between the medial crura to project and equalize the domes. If this is also inadequate to achieve sufficient projection, extended spreader grafts as described by Byrd et al. are used. This procedure is necessary for many of our patients with the bilateral cleft lip nasal deformity. As a rule, these patients are severely deficient of cartilage in the anterior septal angle region. These spreader grafts create a scaffold for anatomic tip reconstruction, allowing the lower lateral cartilage to be directly fixed to a new appropriate septal angle, achieving maximal tip projection. Occasionally, we also use septal or auricular grafts as a stiff batten to augment and stabilize the malformed lower lateral cartilages. Onlay grafts of cartilage may also be necessary to improve tip definition and symmetry.

CONCLUSIONS

Secondary cleft lip nasal deformities are common, but they may be minimized by the use of nasoalveolar molding in the first several months of life. Surgical correction of these problems should be predicated on the severity of the deformity. Residual deformities that concern the patient or parents should be addressed at a young age by mobilization of the deformed alae and reshaping of the tip using intradermal sutures for support. Definitive septorhinoplasty may be performed, if necessary, during the early teen years once growth is complete. This should be accomplished by the open approach, using cartilage grafts to achieve the desired tip projection and shape.
Fig. 5. Definitive cleft lip rhinoplasty and augmentation of nasal support/projection with Le Fort I advancement osteotomy (staged with the rhinoplasty). (Above) Frontal view of preoperative and postoperative appearance. (Below) Lateral view of preoperative and postoperative appearance.

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REFERENCES


Self-Assessment Examination follows on the next page.
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1. ALL OF THE FOLLOWING ARE TRUE ABOUT RHINOPLASTY IN TEENS EXCEPT:
   A) Nasal growth in girls stops at approximately 12 years of age
   B) Nasal growth in boys stops at approximately 13 to 14 years of age
   C) Definitive nasal surgery should be delayed until the teen is emotionally mature
   D) All septal surgery in children should be delayed until cessation of growth regardless of symptoms
   E) Premaxillary orthopedics shows promise in helping set the stage for more normal nasal growth

2. EFFECTIVE WAYS OF IMPROVING NASAL TIP PROJECTION IN THE CLEFT PATIENT INCLUDE
   ALL OF THE FOLLOWING EXCEPT:
   A) Extended spreader grafts
   B) Le Fort I advancement osteotomy
   C) Forked flaps
   D) Cartilage grafts
   E) Cephalic suspension of the lower lateral cartilage

3. NASOALVEOLAR MOLDING CAN BE USED JUST AS EFFECTIVELY ANYTIME WITHIN THE FIRST YEAR OF LIFE.
   A) True
   B) False

4. NASOALVEOLAR MOLDING IMPROVES THE LINING DEFICIENCY SEEN IN THE CLEFT LIP NASAL DEFORMITY.
   A) True
   B) False

5. USE OF FORK FLAPS TO AUGMENT THE COLUMELLA MAY RESULT IN WHICH OF THE FOLLOWING?
   A) An overly long columella
   B) A sharp columellar-labial angle
   C) A rectangular columella
   D) Enlarged nostrils
   E) All of the above

6. THE BASIC GOAL IN SURGERY FOR THE UNILATERAL CLEFT LIP NASAL DEFORMITY IS TO SECURE THE CLEFT SIDE ALA IN MORE MEDIAL AND CEPHALIC POSITION.
   A) True
   B) False